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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/537,725

11/08/2005

Rudolf Bonsch

MDP-103

5175

54630 7590 11/29/2010

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EXAMINER

PO, MING CHEUNG

ART UNIT

PAPER NUMBER

1771

MAIL DATE

DELIVERY MODE

11/29/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/537,725	Applicant(s) BONSCH ET AL.	
	Examiner MING CHEUNG PO	Art Unit 1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 September 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This is the response to amendment filed on 09/07/2010 for application 10/537725.
2. Claims 1-3 are pending and have been fully considered.
3. The Declaration under 37 CFR 1.132 filed 09/07/2010 is insufficient to overcome the rejection of claims 1-3 based upon 35 U.S.C. 103(a) as being unpatentable over JOHNSON (U.S. 5,520,708) in view of KOVACS (WO 03/040081) as set forth in the last Office action because: showing is not commensurate in scope with the claims and fails to set forth facts. The inventor states that that although the application does not specify the strong acid is in dilute aqueous form, it would be obvious to one of ordinary skill in the art that it is. An oil emulsion does not have to have water being carried by the oil. There are other liquids besides water that are immiscible with oil and would produce an emulsion. Therefore, it would not be obvious to one of ordinary skill in the art that the strong acid is in dilute aqueous form. Inventor further states that one of ordinary skill in the art would conclude that JOHNSON must have used anhydrous acids because the acids serve as catalysts in the transesterification reaction, and because water would compete with the alcohol in the esterification process. While it is true that water in a transesterification process would be detrimental, it cannot be proven that JOHNSON used anhydrous acid catalysts.

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Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over JOHNSON (U.S. 5,520,708) in view of KOVACS (WO 03/040081).

JOHNSON teaches a method to reduce the crystallization temperature of a mixture of a fatty acid oil ester-petroleum distillate fuel blend. JOHNSON teaches in lines 15 – 18 of column 3 that the esters used are prepared by transesterification of native oils. Preferably, the esters are taught in lines 19 - 32 of column 3 to be prepared by a type of **transesterification** known as alcoholysis in which the acyl groups in the triglycerides of the oils are exchanged with an alcohol such as **methanol**, so that nearly all the acyl groups are recovered as methyl esters.

JOHNSON teaches an example in lines 65 – 67 of column 3 and lines 1 – 14 of column 4 where a basic catalyst of sodium alkoxide is used and **stirred vigorously** with the reactants at **32°C (between 25 and 60°C)**.

JOHNSON further teaches in lines 19-31 of column 4 that the reaction mixture was then extracted with hexane, washed with water to induce a phase separation into a upper phase which is an ester-rich layer and a lower phase **((b) forming a layer containing the crude methyl ester)**.

JOHNSON does not seem to explicitly state that the methyl ester is intensively

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mixed with a strong acid.

However, JOHNSON further teaches that an acid such as **sulfuric acid or hydrogen chloride** may be used as the acid catalyst when large amounts of free fatty acids are present in the oil.

JOHNSON does not seem to explicitly state that the methyl ester is intensively mixed with to form an emulsion.

However, KOVACS teaches on the second paragraph of page 3 and lines 1-13 of page 4 that the reaction that JOHNSON teaches is mixed and reacted in a static mixer and then the mixture is subjected to a high shear (**in-line mixing**) in the homogenizer to form an emulsion.

It would be obvious to one of ordinary skill in the art to repeat the above steps with the ester-rich phase. Specifically, it would be obvious to one of ordinary skill in the art to perform a transesterification, separate the ester-rich phase containing the methyl esters by inducing a phase separation **((b) separating the layer from the rest of the reaction mixture)**, add **sulfuric acid**, heat to 32°C, subject the mixture to high shear (**in-line mixing**) and form an **emulsion ((c) intensively inline mixing the crude methyl ester later obtained at temperature between 25 and 60°C with a strong acid to form an emulsion)**. The twice-reacted reaction mixture can then be again extracted with hexane, washed with water to induce a phase separation into a upper phase which is an ester-rich layer and a lower phase **((d) separating an ester layer form the emulsion formed)**.

The motivation to do so can be found in lines 1-11 of page 4 of KOVACS.

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KOVACS teaches that to reach a high conversion rate, the polar phase would need to be reacted once again. Furthermore, repeating the steps of a reaction is known to one of obvious skill in the art to increase conversion.

JOHNSON teaches in lines 26-28 of column 4 that the ester-rich layer may be washed with additional water until it became clear. **(subjecting the separated ester later to a thorough water wash)**

JOHNSON does not seem to explicitly teach a subsequent drying step.

However, it would be obvious to one of ordinary skill in the art to perform drying step following a water washing step for a compound intended to be used as biodiesel fuels.

The motivation to do so would be known to one of ordinary skill in the art. Water has a deleterious effect on biodiesel fuels.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claim 3, JOHNSON does not appear to explicitly state the water wash is carried out in a wash column according to the counter current principle or by means of a mechanically intensive mixer.

However, it would be obvious to one of ordinary skill in the art to use a separatory funnel to perform the water washes. A separatory funnel is an intensively mixer.

One of obvious skill in the art would recognize that a separatory funnel is a common piece of equipment that is used in water washes.

An separatory funnel is not mechanical in design but it would be obvious to one of ordinary skill in the art to mechanize the mixing process in a separatory funnel since applicant has not stated that performing the mixing mechanically solves any stated problem or is for any particular reason and the separatory funnel can be mixed by hand or mechanically.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Response to Arguments

6. Applicants' arguments filed 09/07/2010 have been fully considered but they are not persuasive. Applicants argue that Johnson would not achieve the same results of the presently claimed invention because Johnson uses a single distribution between phases and a usual amount of acid catalyst. Applicants stated that is because of the second distribution equilibrium that aids in the hydrophilization of the crystallization nuclei. In response to applicants' arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). As stated before, KOVACS teaches in lines 55-64 of column 2 that to reach a high conversion rate, the apolar phase would need to be reacted once again. Furthermore, repeating the steps of a process is known to one of obvious skill in the art to increase conversion.

Applicants argue that Johnson teaches strong acids as catalysts while they are

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used to aid in splitting the undesired soaps. This is unconvincing because the strong acids such as sulfuric acid would function in both capacities because they are chemically identical. There is no reason to believe that the strong acids that Johnson uses do not also aid in splitting the undesired soaps.

Applicants argue that the intensive mixing and emulsion formation occurs during a transesterification phase, which is before the downstream workup. KOVACS teaches in lines 55-64 of column 2 that to reach a high conversion rate, the apolar phase would need to be reacted once again. Furthermore, repeating the steps of a process is known to one of ordinary skill in the art to increase conversion. Therefore, the second transesterification is downstream from the first transesterification.

Applicants argue that the composition that Johnson teaches is different from the claimed composition no matter at which time. Examiner is stating that Johnson performs a transesterification with acid catalysts. The reaction mixture is then separated by inducing phase separation with hexane and water. The upper phase with hexane is the apolar phase and it is reacted again with acid catalysts. Examiner further reminds the applicants that the current claims do not teach the amount of strong acid that is used.

Applicants argue that it would not be obvious to form an emulsion because KOVACS incorrectly states that JOHNSON teaches the use of a homogenizer. Examiner disagrees. KOVACS teaches a combination of references and further states the oil, with the catalyst are heated to reaction temperature and then sent to be subjected to high shear in the homogenizer to form an emulsion. KOVACS teaches that

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1-11 of page 4 that a significant reduction in time can be attained by using by forming the emulsion with a homogenizer. Even if JOHNSON does not explicitly teach a homogenizer, it would be obvious to one of ordinary skill in the art to modify the process that JOHNSON teaches to use the homogenizer and subject the reactants to high shear.

Applicants argue that it is not possible to form an emulsion with oil without water. KOVACS specifically teaches in line 1-3 of page 4 that an emulsion can be formed following the process that JOHNSON teaches by subjecting the reactants to high shear from a homogenizer. Furthermore, an oil emulsion does not have to have water. An emulsion is defined by two immiscible liquids. Other liquids are also immiscible with oil, such as alcohol.

.Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. DUNKEL (DE10043644) teaches a process for the production of biomethanol and bioethanol diesel comprising esterification and washing the biodiesel formed with phosphoric acid and water. DUNKEL appears to teach in paragraph 12 of the machine translation that the phosphoric acid washing step is done with temperature of approximately 60°C.

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MING CHEUNG PO whose telephone number is (571)270-5552. The examiner can normally be reached on 9:00 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571)272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ming Cheung Po/
Patent Examiner

/Glenn A Caldarola/
Supervisory Patent Examiner, Art
Unit 1771